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PUB-NO: JP363042829A
DOCUMENT-IDENTIFIER: JP 63042829 A
TITLE: MOLDING BY MOLD

PUBN-DATE: February 24, 1988

INVENTOR-INFORMATION:

NAME	COUNTRY
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ASSIGNEE-INFORMATION:

NAME	COUNTRY
ALPS ELECTRIC CO LTD	

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APPL-NO: JP61187345
APPL-DATE: August 9, 1986

INT-CL (IPC): B29C 45/73

ABSTRACT:

PURPOSE: To improve the transferring properties of the surface of a mold to a molded form as well as the appearance and quality of the same, by a method wherein the surfaces of the cavity and the core or either one of them of the mold are heated directly before the mold is filled with molding material, then, the molding material is applied into the mold.

CONSTITUTION: Air, supplied through a compressed air supplying port 11, is passed through an air supplying hose 16 and a heating valve 12, then, the temperature thereof is raised by a heating device 13. In this case, a cooling valve 7 and a cooling water purging valve 10 are closed and the air is stagnated in the hose 2a. The temperature of a cavity 3a is detected by a temperature sensor 14 and a signal is sent into a controller 17. The controller 17 sends a signal to a heating valve 12 when the temperature detected by the temperature sensor 14 has arrived at the melting temperature of molding material 6 to close the heating valve 12. At the same time, the beating device 13 is separated from a space between the fixed mold 3 and a movable mold 4, thereafter, the fixed mold 3 and the movable mold 4 are mated and molten molding material 6 is applied into the space between the cavity 3a and a core 4a.

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⑲日本国特許庁(JP)　⑪特許出願公開

⑫公開特許公報(A)　昭63-42829

⑤Int.Cl.⁴　識別記号　庁内整理番号　⑬公開　昭和63年(1988)2月24日
B 29 C 45/73　7179-4F

審査請求　未請求　発明の数 1　(全5頁)

⑭発明の名称　成形金型による成形方法

⑳特　願　昭61-187345
㉒出　願　昭61(1986)8月9日

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明　細　書

1.発明の名称

成形金型による成形方法

2.特許請求の範囲

成形材料を成形するキャビティー及びコアを備えた雌雄一対の成形金型による成形方法において、成形材料を充填する前にキャビティー及びコア、又はいずれか一方の表面を直接加熱する手段を備え、前記手段により、成形材料を充填する前にキャビティー及びコアの少なくとも一方の表面を加熱した後に成形材料を充填する事を特徴とする成形金型による成形方法。

3.発明の詳細な説明

〔産業上の利用分野〕

本発明は成形金型による成形方法、特に射出成形金型等、成形金型表面の転写性が要求される成形品を得るための成形金型による成形方法に関する。

〔従来の技術〕

従来の成形金型による成形方法の概略を示す構成の一例を第3図に示す。図中3は固定金型で、固定金型3には成形材料を成形するキャビティー3aと、該キャビティー3aと連通し成形材料がキャビティー3aに流し込む空間のスプルー3cと、キャビティー3aを温調する冷却水の流水路3bとが形成されている。

4は固定金型3と対向する可動金型で、この可動金型4には成形材料を成形する前記キャビティー3aと対をなすコア4aと、コア4aを温調する冷却水の流水路4bとが形成されている。

1は金型温調器で、成形時の成形材料の冷却を行なうため、成形材料の固化する温度範囲の温水を供給する装置である。

この金型温調器1には、ホース2が接続され、ホース2は分岐し、それぞれ固定金型3の流水路3bと可動金型4の流水路4bに接続されている。

Aは射出成形機であり、射出成形機より溶融した成形材料が吐出する吐出口が、固定金型3のスプルー3cと密着している。

第3図(1)は固定金型3と可動金型4とが閉じら

れた状態である。

この状態で、まず射出成形機から溶融した成形材料が吐出され、スプルー3cを通り、キャビティー3aとコア4aの間に流し込まれる。

次に金型温調器1より流水路3b、4bを通して温水が供給される。これによりキャビティー3aとコア4aの間の成形材料は冷却、固化する。

成形材料が固化した後、第3図(h)の様に可動金型4が可動し、固定金型3と可動金型4の空間より成形品5を取り出すものとなっている。

〔発明が解決しようとする問題点〕

しかしながら、このような従来の成形金型による成形方法にあっては、第2図(f)に示すように、キャビティー3aとコア4aの空間に、溶融した成形材料6を流し込む過程において、キャビティー3a及びコア4aの表面温度が低いため、溶融した成形材料6は、キャビティー3aとコア4aの表面と接触した部分に、固化層6aを形成しながら流動する、キャビティー3a及び、コア4aと流動中の成形材料6との境界部を拡大すると第2図(h)に示すように、流動中の溶融した成形材料6の圧力は流動方向に逃げるため、キャビティー3a及び、コア4aの表面と成形材料6の固化層6aは密着しない。

キャビティー3aとコア4aの間に成形材料6が充満すると成形材料6に圧力がかかるが、この時すでに成形材料6の固化層6aが形成されているためキャビティー3aとコア4a表面の成形品5への転写性は悪い、さらに第2図(f)に示すように、成形材料6の充填時に、固化層6aにより溶融した成形材料6の通り道が、せばめられるため充満するのに、射出成形機より高い吐出圧力が必要となる。

また成形材料6の固化層6aの厚さは溶融した成形材料6の温度、吐出速度、粘度、及び成形材料充填前のキャビティー3aとコア4aの表面温度に左右され、これらの要因を一定に保つ事が非常に困難であるため、第4図に示すように、成形品5の外観は、ウエルドライン5aまたはフローマーク5b等の不良の発生、成形品内部応力による変形、キャビティー3aとコア4a表面状態の転写に、ばらつきを生じやすいという問題点があった。

本発明の目的は、上記した従来技術の欠点を除き、金型表面の成形品への転写性を向上し、成形品の外観及び、品質を向上することにある。

〔問題を解決するための手段〕

本発明は成形金型に成形材料が充填される前に、成形金型のキャビティー及びコア、又はいずれか一方の表面を直接加熱した後に成形材料を充填することを特徴とするものである。

〔作用〕

上記技術的手段は次の様に作用する。

金型表面を成形材料の充填される前に、加熱し成形材料の溶融温度まで昇温することにより、成形材料が金型表面に接触した際、固化層を形成しないので、第2図(h)に示すように、成形品の金型表面の転写性が向上し、ウエルドライド、フローマーク等の外観不良が無くなる、さらに充填抵抗が減少することから低射出速度、低射出圧力で充填可能となるため、低歪の成形品を得ることができる。

〔実施例〕

以下、本発明を図面に基づいて説明する。

第1図は、本発明の一実施例を示す成形金型による成形方法の概略を示す構成図である。

まず構成を説明すると、図中3は固定金型であり、固定金型3には、成形品を成形するキャビティー3a、スプルー3c、冷却する流水路3bが形成されており、更にキャビティー3aの温度が感知できる温度センサー14及び15をそれぞれ備えられている。

4は固定金型3と対向する可動金型であり、可動金型には成形品を成形するコア4aと、流水路4bが形成されている。固定金型3と可動金型4を合わせ、キャビティー3aとコア4aの間に溶融した成形材料を流し込み成形品を得るものである。

金型温調器1には、ホース2が接続され、冷却バルブ7が接続され、冷却水逆流防止弁8が接続され、ホース2aは分岐し、それぞれ固定金型3の流水路3bと可動金型4の流水路4bに接続されている。

11は圧縮空気供給口であり、空気供給ホース16

が接続され、空気供給ホース16は分岐し、それぞれ冷却水パージバルブ10と加熱バルブ12に接続している。

加熱バルブ12は加熱装置13に接続してある。

冷却水パージバルブ10には、冷却水逆流防止弁9が接続され、ホース2aへ接続してある。

加熱装置13にはヒーター13aが内装されており、加熱バルブ12を通過した空気を高温に昇温しノズル13bより吐出し、キャビティー3aとコア4aにあてるようになっている。

固定金型3に備えられた温度センサー14及び15はキャビティー3aの温度を感知し、コントローラー17へ信号を送る。コントローラー17は温度センサー14及び15の信号により、冷却バルブ7と冷却水パージバルブ10及び、加熱バルブ12に信号を送り、それぞれのバルブ開閉を行なう。

次に動作について説明すると、一工程の動作は、圧縮空気供給口11より供給された空気は、空気供給ホース16を通り加熱バルブ12を通過し、加熱装置13で昇温される。この時、冷却バルブ7と冷却水パージバルブ10が閉じた状態であり、ホース2aの内部は空気が溜まっている状態である。

キャビティー3aの温度を温度センサー14で感知しコントローラー17へ信号を送る。コントローラー17は温度センサー14で、感知した温度が成形材料6の溶融温度に達した時、加熱バルブ12に信号を送り、加熱バルブ12を閉じる、と同時に加熱装置13は固定金型3と可動金型4の間から離れ、その後固定金型3と可動金型4が合わせられ、キャビティー3aとコア4aの間に溶融した成形材料6を充填する。

成形材料6が充填完了後、冷却バルブ7を開き、金型温調器1より矢印方向に冷却水が供給され、冷却水はホース2を通り冷却バルブ7を通過し、冷却水逆流防止弁8を通過し、ホース2aを通過し、固定金型3の流水路3bと可動金型4の流水路4bをそれぞれ通過する。通過する際、キャビティー3aとコア4aを冷却する。この時、冷却水逆流防止弁9は空気供給ホース16に冷却水が入らないように弁が閉じる。

固定金型3に備えられた温度センサー15はキャビティー3aの温度を感知しコントローラー17へ信号を送る。コントローラー17は温度センサー15で感知した温度が成形品の取り出せる温度に達したとき、冷却バルブ7に信号を送り、冷却バルブ7を閉じると同時に冷却水パージバルブ10に信号を送り、冷却水パージバルブ10を開き、圧縮空気が圧縮空気供給口11より空気供給ホース16を経てホース2aに入り、ホース2aに入っている冷却水を押し出す。この時、冷却水逆流防止弁8はホース2aに圧縮空気が入らないように弁が閉じる。

冷却水パージバルブ10はホース2aの中に入っている冷却水を押し出す時間2～5秒後に弁が閉じる。

上述した動作と連動して、冷却水パージバルブ10を開いたと同時に固定金型3と可動金型4が開き成形品5を取り出す。

成形品5を取り出した後に固定金型3と可動金型4の間に加熱装置13が入り、加熱バルブ12が開く。以上が動作の一工程である。

このように金型表面を直接加熱する手段を備えることにより、成形材料充填時、流動層に固化層を形成することがないため、第2図(A)に示すように成形品への金型表面転写性が著しく向上する。

また加熱手段としてヒーターに限らず、赤外線、高周波誘導加熱等がある。又加熱は必要に応じて、キャビティー3a又はコア4bいずれか一方でもよい。

〔発明の効果〕

成形材料の流動時に固化層を形成しない様、金型表面を成形材料の充填前に加熱し、成形材料の溶融温度まで昇温可能としたため、成形品への金型表面転写性が著しく向上し、ウエルドライン又はフローマーク等の外観不良がなく、成形品内部応力による変形の減小、さらに低射出速度、低射出圧力で充填可能となるため低歪の成形品を得ることができるという効果が得られる。

4.図面の簡単な説明

第1図は本発明の一実施例を示す成形金型による成形方法の概略を示す構成図、第2図(A)は成形材料の充填過程における金型内の成形材料充填過

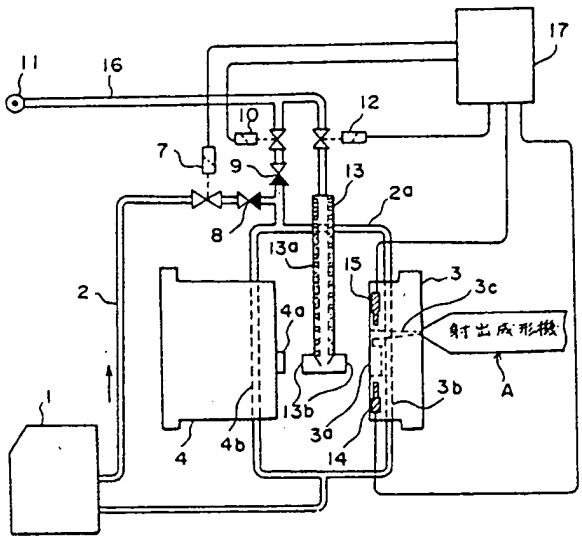
程の状態図、第2図(ロ)、(ハ)は第2図(イ)の拡大図、第3図(イ)、(ロ)は従来における成形金型による成形方法の概略を示す構成図、第4図は成形品の斜視図である。

1…金型温調器
2…ホース
3…固定金型
4…可動金型
3a…キャビティー
4a…コア
5…成形品
6…成形材料
7…冷却バルブ
8…冷却水逆流防止弁
9…冷却水逆流防止弁
10…冷却水パージバルブ
11…圧縮空気供給口
12…加熱バルブ
13…加熱装置
14…温度センサー
15…温度センサー
16…空気供給ホース
17…コントローラー

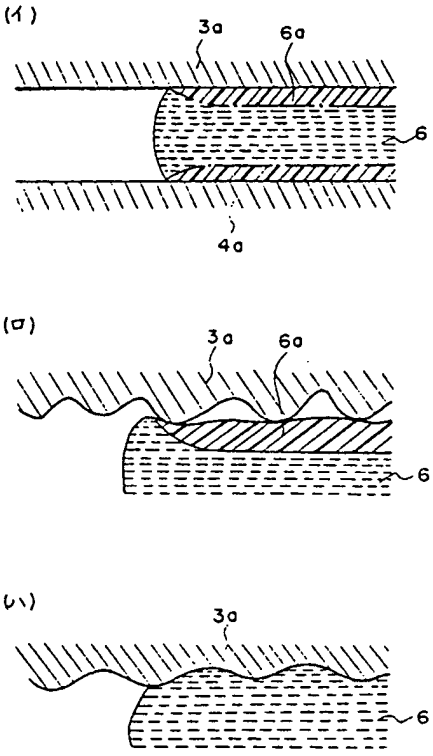
特許出願人　アルプス電気株式会社

代表者　片岡　勝太郎

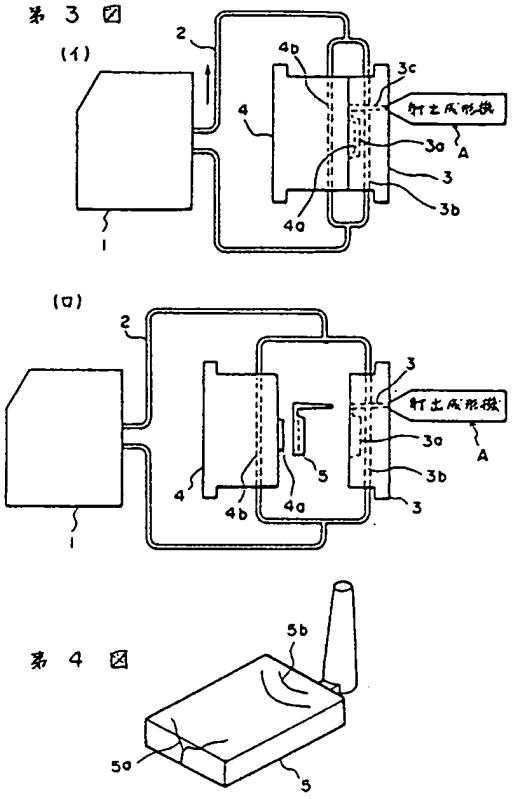
第1図



第2図



第３図



第４図

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 249 116**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **87107883.8**

(51) Int. Cl.[4]: **G06F 13/12**

(22) Date of filing: **01.06.87**

(30) Priority: **02.06.86 JP 125725/86**

(43) Date of publication of application:
16.12.87 Bulletin 87/51

(84) Designated Contracting States:
DE FR GB

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(54) Method for controlling data transfer buffer.

(57) In a data processing system in which data is transferred between memory areas (A, B, C, D, E) through a transfer buffer (58) shared by the memory areas, receive capability indication means (59) which is commonly accessable by the memory areas and contains information indicating whether data can be transferred to the respective memory areas or not is provided, and data to be transferred from one memory area to other memory area is stored in the transfer buffer in accordance with the content of the receive capability indicator.

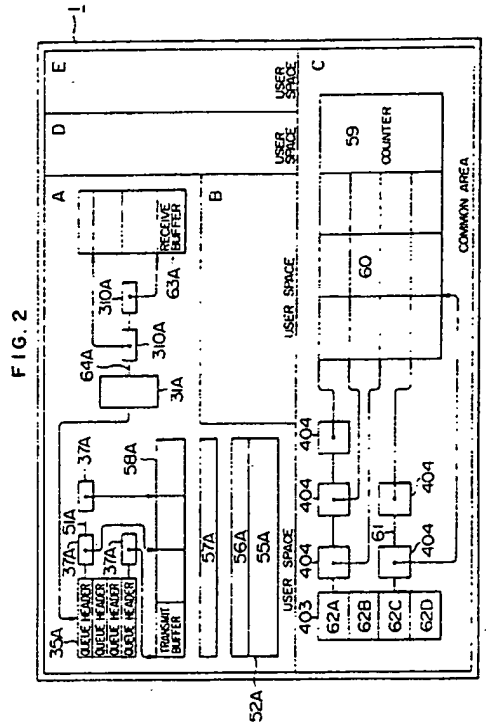


FIG. 2

EP 0 249 116 A2

METHOD FOR CONTROLLING DATA TRANSFER BUFFER

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method for controlling a data transfer buffer suitable for use when a capacity of the buffer is limited in a computer system in which information is transmitted and received through the buffer.

Description of the Prior Art

In a computer system, a memory area called a user space is allocated to each of a plurality of user programs in a main memory.

When data is to be transferred between those spaces, transfer data is stored, under a control of the user program of a transferring location, to a transfer buffer in a memory area to be commonly accessed by the user programs, and the data in the transfer buffer is received, under a control of a user program of a destination location, by a memory area to which the user program of the destination area belongs. In the prior art system, sufficient consideration was not paid for a capability of reception at the destination space, and the transfer data is stored in the transfer buffer area in response to a transfer request irrespective of whether the destination space is ready to receive the data or not, and the information is enqueued to a transfer quene which manage readout of the stored data. As a result, if the destination station is not ready to receive the information, the information is held in the transfer buffer area. Thus, if a large amount of data is transferred between spaces, the information may be held for a long time. JP-A-58-1222 teaches providing a large capacity data buffer and sharing it for a plurality of times of data transfer.

However, even in the manner, the most portions of the buffer area may be occupied by the data in certain probability. Then, the request for data transfer is rejected.

SUMMARY OF THE INVENTION

It is an object of the present invention to transfer data while preventing data from being held in a transfer buffer area.

In accordance with the present invention, indication means for indicating a status of a receive buffer in each space is arranged in a common area to the system. The information of the display unit is referenced by the transfer location so that it grasps the status of the receive buffer at the destination location. Thus, whether the destination station may immediately receive the data or not is checked, and if it may receive, the transfer data is sent to the transfer buffer. The transfer location determines the amount of data receivable by the destination location and sends that amount of data. Thus, the transfer of an amount of data not receivable by the destination station into the buffer is prevented. By queuing a transfer request on FIFO basis on each space to which the request was issued, separately from the transfer processing, the transfer may be suspended until it is permitted, without any special processing.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows an overall configuration of an electronic computer system to which the present invention is applied,

Fig. 2 shows a configuration in a central processing unit,

Fig. 3 shows a format of a table and a buffer area in each user area in one embodiment of the present invention,

Fig. 4 shows a format of a table in a common area and a transfer buffer,

Fig. 5 shows a transmit flow chart in a transfer execution program, and

Fig. 6 shows a receive flow chart in the transfer execution program.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 shows an overall configuration of an electronic computer system to which the present invention is applied. It comprises a central processing unit 1, a communication control unit 2, terminal control units 3 and 4 connected thereto through lines 11 and 12, respectively, terminal devices 5, 6, 7 and 8 connected thereto, a communication control unit 9 connected to the communication control unit 2 through a line 13, and a central processing unit 10 connected thereto. The communication control unit 9 is also connected to the terminal control units 3 and 4 through lines 14 and 15, respectively.

In the electronic computer system thus configured, one embodiment of the present invention in which information is transferred between spaces in each of the central processing units in accordance with a request from or to the terminal device or central processing unit in the network, is explained with reference to Fig. 2. A, B, D and E in the central processing unit 1 denote memory spaces in user programs, and C denotes a common area shared by those spaces. Information is transferred between the spaces through the common area C. A detailed configuration of the memory space A is shown in Fig. 2. The memory spaces B, D and E are configured in the same way. In order to identify the elements in the memory space A, the reference numerals are followed by "A". Assuming that a request to transfer information in the space A to the space B has been issued, a transfer request program 57A registers the request into a transfer queue 51A by an enque command. The transfer request program 57A examines a destination, puts together information to be transferred to the same destination to prepare a queue, and sends a start signal to a transfer execution program 52A. Then, they are dequeued from the transfer request queues on first-in first-out basis. The dequeued information is checked. That is, receive buffers 62 for the respective spaces and the common buffer counter 59 in the common buffer area C are checked. The counter 62B which retains a count to indicate the number of receivable buffer areas each having the same size in the receive buffer 58B in the destination space is examined. If the count of the counter 62B is "0", the transfer is stopped and the previous dequeue command is cancelled. Accordingly, the transfer request is retained in the queue 51A. On the other hand, if the count of the counter 62B is not "0", it means that the information may be transferred, and the counter is decremented by one.

The transfer common buffer pool 60 has a buffer divided into areas of the same size. A counter 59 which counts the number of free buffers which are not being used by others is examined. If the count of the counter 59 is "0", the dequeue command is cancelled. If the count of the counter 59 is not "0", one buffer area is allocated as a transfer buffer, the counter 59 is decreased by one, and the transfer information is copied into the secured transfer buffer 60. Thereafter, the transfer buffer is enqueued in the transfer queued. In the transfer queue 61, addresses indicating the areas of the buffer 60 are chained for each address in the sequence of occurrence. That is, they are queued for each destination, like the transfer request queue 51A. A start signal is sent to the transfer execution unit 52B of the destination space to start 52B. The reception of data is now explained. The transfer queue/dequeue unit 55B in the started 52B dequeues a head of the transfer queue to itself from the transfer queue 61 on a first-in first-out basis. The dequeued information is sent to the receive unit 56B and the content thereof is copied into the receive buffer 58B. Upon end of copying, the transfer buffer is vacant. The counter 59 is incremented by "1" and the transfer operation is terminated. The receive buffer 58B is released after required processing in the space B. When it is released, the counter 62B is incremented by one.

A detail of the transfer operation in the present embodiment is explained with reference to a flow chart and a table format.

Fig. 3 shows a detail of a table prepared in each user space.

A space control table 31 is prepared in each space. It contains a transfer information queue pointer 33 which points a start point of a transfer queue header list 35 for each space, and a transfer information queue pointer 34 which points an end point. The entry of the transfer queue header list 35 is provided for each destination space. If no information transfer request has been issued in the space, the header list 35 thereof is all-zeros. As many header lists 35 as a maximum number (36) of spaces permitted to exist in the system are provided.

The transmit buffer 39 stores the transmit data generated by executing the user program. The transmit buffer 39 is prepared by allocating memory areas by a conventional control table. The transmit information control table 37 is prepared when the transmit data is stored in the transmit buffer. A predetermined number of receive buffer 311 are provided in the user space. If data is stored therein, a receive information control table 310 is prepared and it is accessable by a space control table 31.

Fig. 4 shows a detail of the table prepared in the common area for use in the check. As many space control tables 403 as a maximum number of spaces permitted to exist in the system when the system was structured, and they control the number of destination receive buffers. One control table is allotted for each space newly established. The common area space control table 403 contains the number 412 of operable receive buffers 311 which are present in the assigned space. A predetermined number of transfer buffers 407 are provided. A size of one plane of the transfer buffer 407 is equal to that of the receive buffer 311 in the user space. Thus, information copied on one plane of the transfer buffer 407 in the common area can be copied onto one plane of the receive buffer 311.

Processing for transferring data from one user space to other user space is explained.

When a transfer request is issued from the user program, a transfer request processing program prepares a transmit information control table 37 in which a destination space name is registered and which has a buffer pointer to point a transmit buffer in which the transfer data is to be stored. Then, the destination space 38 is read from the transmit information control table 37 and the transmit information control table 37 is enqueued into a corresponding queue header of the transfer queue header list 35 in accordance with the content of the destination space 38. As the transfer request processing program has enqueued the transmit request control table 37 into the transfer queue header list 35, it sends a start signal to the transfer execution program of Fig. 5.

The transfer execution program of Fig. 5 dequeues the transmit information control table queued in the transfer queue header pointed by the space control table 31, from the start point 33 of the header on first-in first-out basis (101). Before the table is dequeued from the chain, the following check is carried out.

The transfer execution program first obtains a pointer for the common area space control table 403 from the system control table 401 in the common area. Then, it obtains the number 412 of operable receive buffers 412 in the receive space from the common area space control table 403. The number of planes of the receive buffer prepared for the space has been set when the system was structured. If there are 20 planes in receive buffer in the space, the number 412 is 20. If the number is not zero (YES in 102), it means that the buffer which is usable as a receive buffer still remains in the space. In order to reserve that receive buffer, the entry is decremented by one (103). Thus, the number of usable receive buffers is decremented by one and one plane of receive buffer in the space is reserved. If the number is zero, it means that no information can be transferred to that space. Thus, the transfer execution ceases the transfer to the space pointed by the transfer queue header list 35 in the space (108), and updates the pointer to the next space (109). As a result, the transfer execution program is resumed for the next space rather than the previous space. The transfer request issued to the previous space is chained in the transfer queue header list without being dequeued.

If one plane of the receive buffer has been successfully secured by the check of the number of usable receive buffers by the transfer execution program, then the number 410 of usable buffers in a base portion of the buffer pool 406 in the common area is checked (104). If the entry is not zero, it means that an area usable as a transfer buffer still reamins in the common area, and one plane is secured from a free queue pointed by the usable buffer pointer 409 and the number of usable buffers is decremented by one (105). The number 410 of usable buffers corresponds to the number of planes of the buffers prepared in the common area when the system is structured. If there are ten planes in the transfer buffers prepared in the common area, the number 410 is ten. If the number is zero, the transfer is ceased as is done for the check of the number 412 of usable receive buffers of the common area space control table 403. In order to release the receive buffer in the receive space which has already been reserved, the number 412 of usable receive buffers 412 of the common area space control table 403 is incremented by one (110). The transfer execution program ceases the execution while it chains all transfer requests in the transfer queue header list 35 (111).

After the transfer buffer of the common area has been successfully secured, the transfer information control table 37 is dequeued from the chain of the transfer queue header list 35. Information is copied to the previously secured common area transfer buffer 407 (106). The transfer information control table 404 is enqueued into the common area space control table 403.

After the enqueuing, the transfer execution program sends a start signal to the transfer execution program of the destination space (112).

Whether the transfer queue is present in the user space or not is checked (113), and if it is present, the above steps are repeated, and if it is not present, the process is terminated.

The transfer execution program of the receive space started from the transfer location is now explained with reference to a flow chart of Fig. 6.

As described above, after the information has been copied into the common area and enqueued into the corresponding common area space control table 403, the receive location is started. The transfer execution program in the receive location dequeues the transfer information queued in the common area space control table 403 for its own space on first-in first-out basis (601), and copies it into the previously reserved receive buffer 311 (602). After the copying, the receive information control table 310 is prepared and it is chained to the queue 312 (603). The receipt of data is informed to the receive information control program (604). Then, the buffer 407 in the common area is released (605). The chain of the usable buffer pointers 409 is updated, the number 410 of usable buffers is incremented by one, and a signal is sent to a space in the common area which is waiting because of shortage of buffer to inform that the common area buffer is available (606).

Whether the transfer queue still remains or not is checked (607), and if it remains, the above steps are repeated, and if it does not remain, the process is terminated.

After the common area buffer has been released by the receive information control program, the received information is processed in the receive space and then the receive buffer is released. When it is released, the number 412 of usable buffers in the common area space control table 403 is incremented by one, a signal is sent to all spaces to inform that there is an available receive buffer in its own space, and the transfer execution programs in the respective spaces are started.

In accordance with the present embodiment, when the receive buffer in the destination location is not ready to receive, the request has to wait at the transfer location. Thus, the common buffer for transfer is not occupied for a long time. On the other hand, it is assured that the information on the common buffer is received by the destination location. Accordingly, the information is not held for a long time. Thus, an affect to certain transfer operation by failure of other transfer is prevented.

In accordance with the present invention, since the status of the receive buffer in the receive location can be grasped at the transmit location, it is prevented that an amount of information which cannot be received is supplied to the transfer buffer and the data continuously flows on the buffer. Even if certain transfer fails due to saturation of the receive buffer, other transfer can continuously flow independently. As a result, the transfer buffer may be used as a pipeline and the failure of transfer due to buffer block or buffer shortage is prevented.

Claims

1. A method for controlling data transfer in a data processing system including a plurality of memory areas (A, B, C, D, E) each having a receive buffer (63) and a transfer buffer (58) commonly accessable by said memory areas wherein data is transferred between the memory areas through said transfer buffer, said data processing system including indication means (59) for indicating availability of the receive buffers of said memory areas, said method comprising the steps of:

a) referencing said indication means in response to occurrence of data to be transferred in one memory area to determining whether the receive buffer of the destination memory area is available or not,

b) storing the data to be transferred into said transfer buffer when said receive buffer is vacant, and

c) transmitting the data stored in said transfer buffer to said receive buffer of the destination memory area.

2. A method for controlling data transfer according to Claim 1 further comprising the step of: holding the data to be transferred in a transferring memory area instead of transmitting the data when the receive buffer of the destination memory area is not available.

3. A method for controlling data transfer according to Claim 1 or 2 wherein said indication means includes counter means to which the number of receive buffers provided in said memory areas is initially set, and said counter means is decremented each time the receive buffer is occupied and incremented each time the receive buffer is released.

4. A method for controlling data transfer according one of the Claims 1 to 3 wherein said memory areas each includes a queue header for the transfer data and a transmit information control table pointed by said header for pointing an area in which the data to be transferred is stored, and in said step a), the transmit information control table which points the area in which the data to be transferred is stored is searched, and if it is found, said indication means is referenced to check whether the receive buffer of the destination location memory area is vacant or not.

5. A method for controlling data transfer according one of the Claims 1 to 4 wherein said counter means is commonly accessable by said memory areas.

FIG. 1

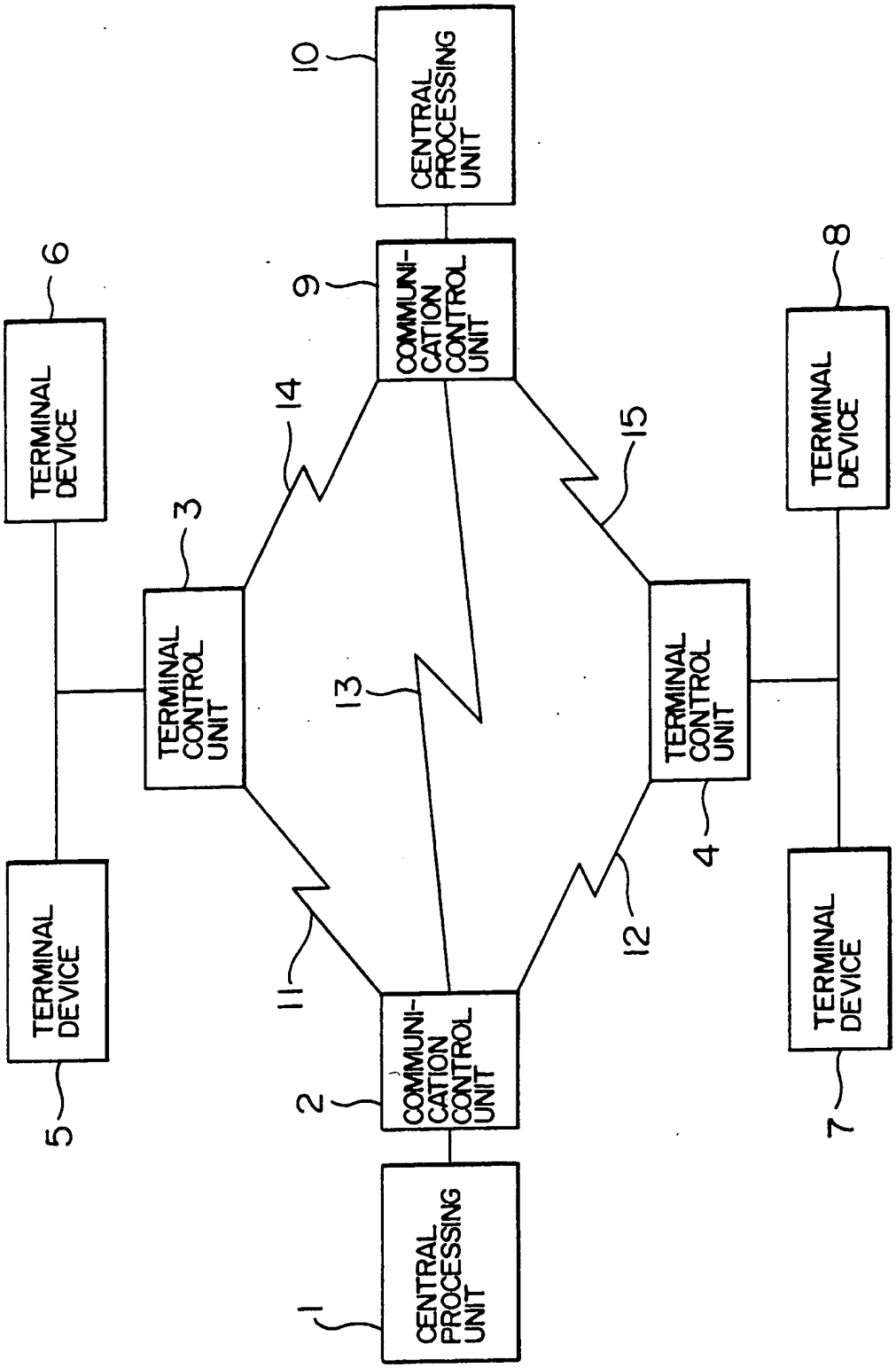

CENTRAL PROCESSING UNIT
1
COMMUNI-CATION CONTROL UNIT
2
TERMINAL CONTROL UNIT
3
TERMINAL CONTROL UNIT
4
TERMINAL DEVICE
5
TERMINAL DEVICE
6
TERMINAL DEVICE
7
TERMINAL DEVICE
8
COMMUNI-CATION CONTROL UNIT
9
CENTRAL PROCESSING UNIT
10
11
12
13
14
15

FIG. 2

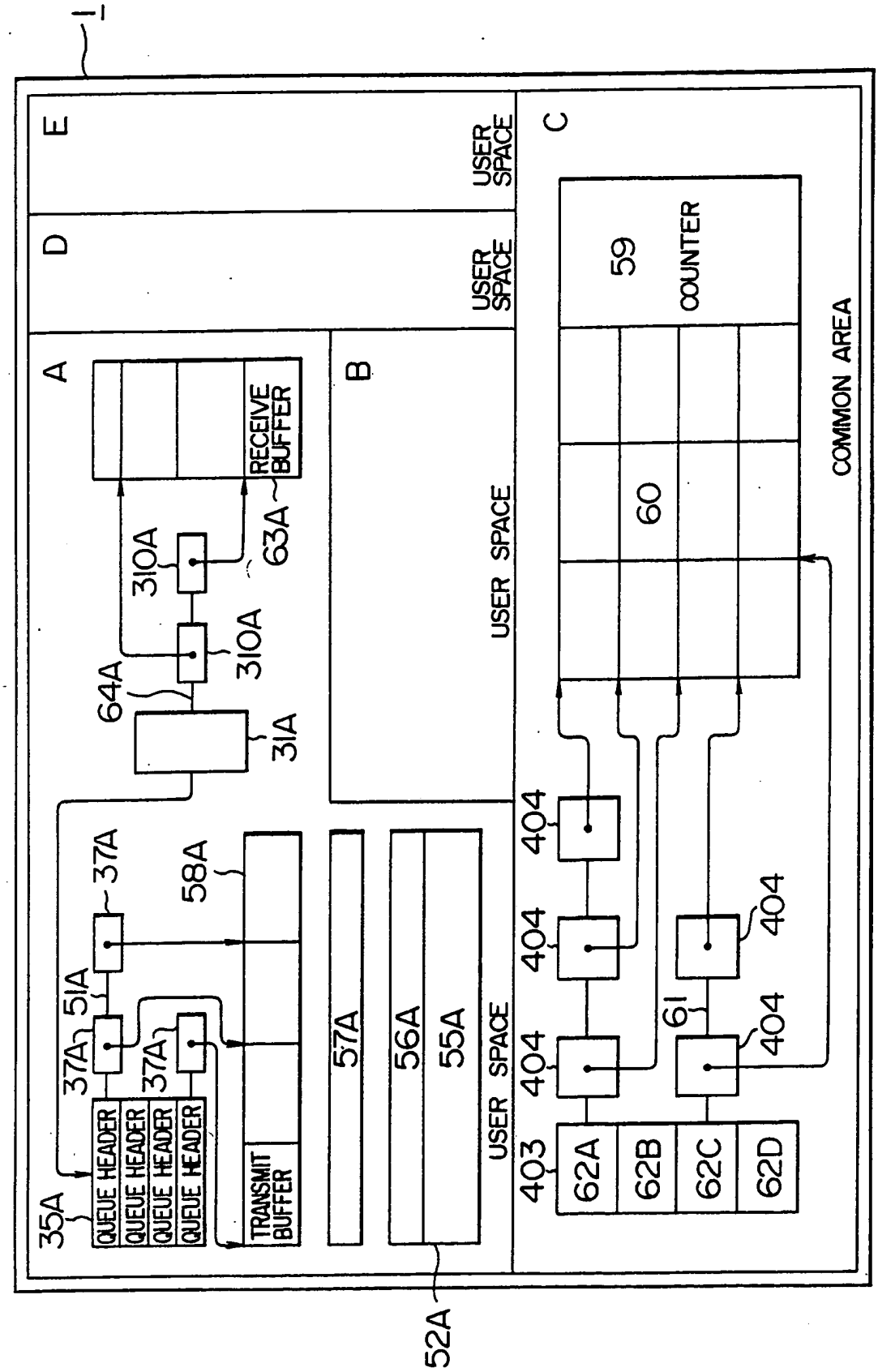

1
A
B
C
D
E
USER SPACE
USER SPACE
USER SPACE
COMMON AREA
RECEIVE BUFFER
63A
310A
310A
64A
31A
59
COUNTER
60
404
404
404
404
404
61
403
62A
62B
62C
62D
35A
QUEUE HEADER
QUEUE HEADER
QUEUE HEADER
37A
37A
37A
51A
58A
TRANSMIT BUFFER
57A
56A
55A
52A

FIG. 3

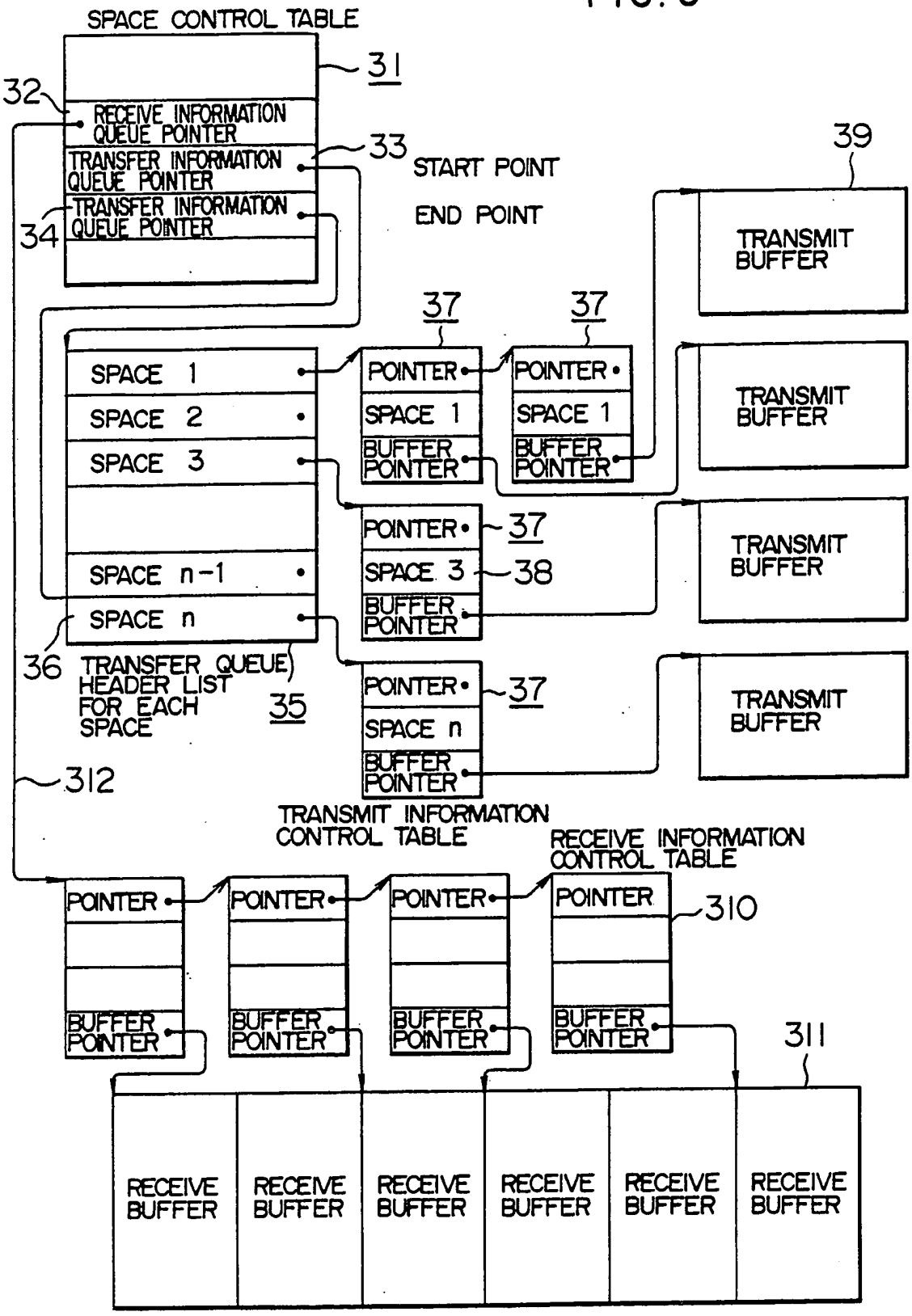

SPACE CONTROL TABLE
31
32
RECEIVE INFORMATION QUEUE POINTER
33
TRANSFER INFORMATION QUEUE POINTER
34
TRANSFER INFORMATION QUEUE POINTER
START POINT
END POINT
39
TRANSMIT BUFFER
37
37
SPACE 1
SPACE 2
SPACE 3
SPACE n-1
SPACE n
POINTER
SPACE 1
BUFFER POINTER
POINTER
SPACE 1
BUFFER POINTER
TRANSMIT BUFFER
POINTER
37
SPACE 3
38
BUFFER POINTER
TRANSMIT BUFFER
36
TRANSFER QUEUE HEADER LIST FOR EACH SPACE
35
POINTER
37
SPACE n
BUFFER POINTER
TRANSMIT BUFFER
312
TRANSMIT INFORMATION CONTROL TABLE
RECEIVE INFORMATION CONTROL TABLE
POINTER
POINTER
POINTER
POINTER
310
BUFFER POINTER
BUFFER POINTER
BUFFER POINTER
BUFFER POINTER
311
RECEIVE BUFFER
RECEIVE BUFFER
RECEIVE BUFFER
RECEIVE BUFFER
RECEIVE BUFFER
RECEIVE BUFFER

FIG. 4

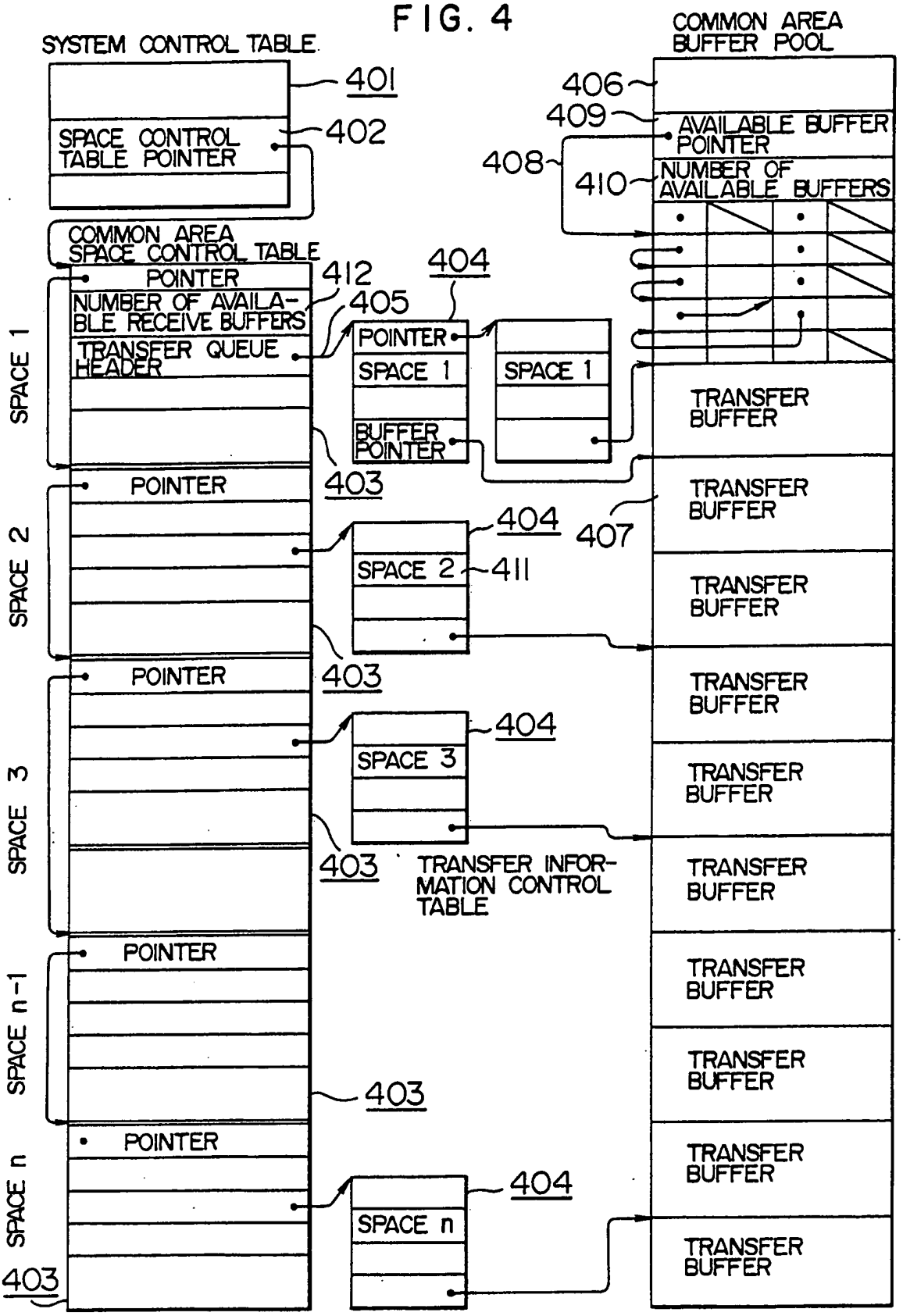

SYSTEM CONTROL TABLE
401
SPACE CONTROL TABLE POINTER
402
COMMON AREA SPACE CONTROL TABLE
POINTER
NUMBER OF AVAILABLE RECEIVE BUFFERS
TRANSFER QUEUE HEADER
412
405
404
POINTER
SPACE 1
BUFFER POINTER
SPACE 1
403
SPACE 1
SPACE 2
SPACE 3
SPACE n-1
SPACE n
POINTER
404
SPACE 2
411
407
404
SPACE 3
403
TRANSFER INFORMATION CONTROL TABLE
403
404
SPACE n
403
COMMON AREA BUFFER POOL
406
409
AVAILABLE BUFFER POINTER
408
410
NUMBER OF AVAILABLE BUFFERS
TRANSFER BUFFER
TRANSFER BUFFER
TRANSFER BUFFER
TRANSFER BUFFER
TRANSFER BUFFER
TRANSFER BUFFER
TRANSFER BUFFER
TRANSFER BUFFER
TRANSFER BUFFER

FIG.5

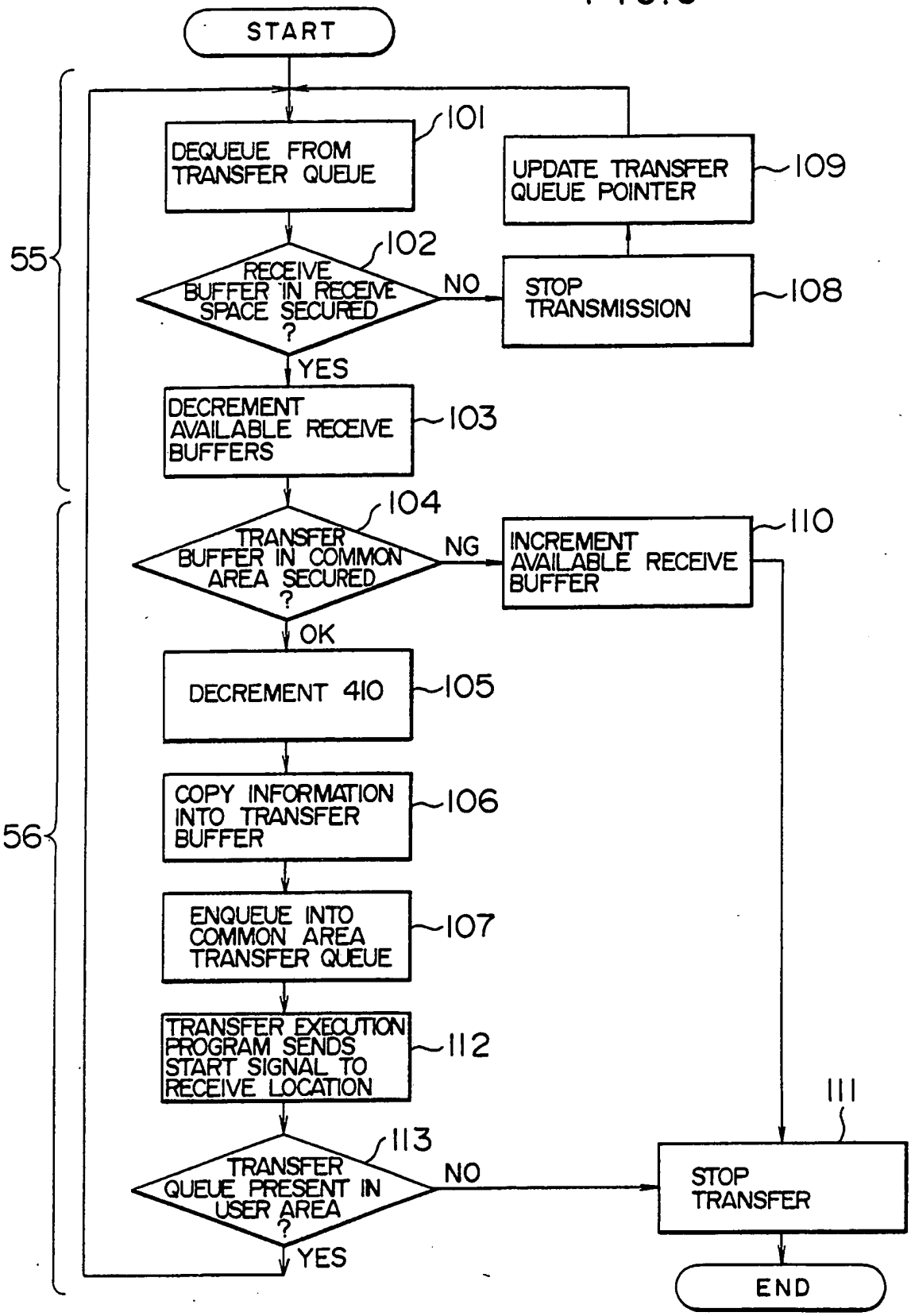
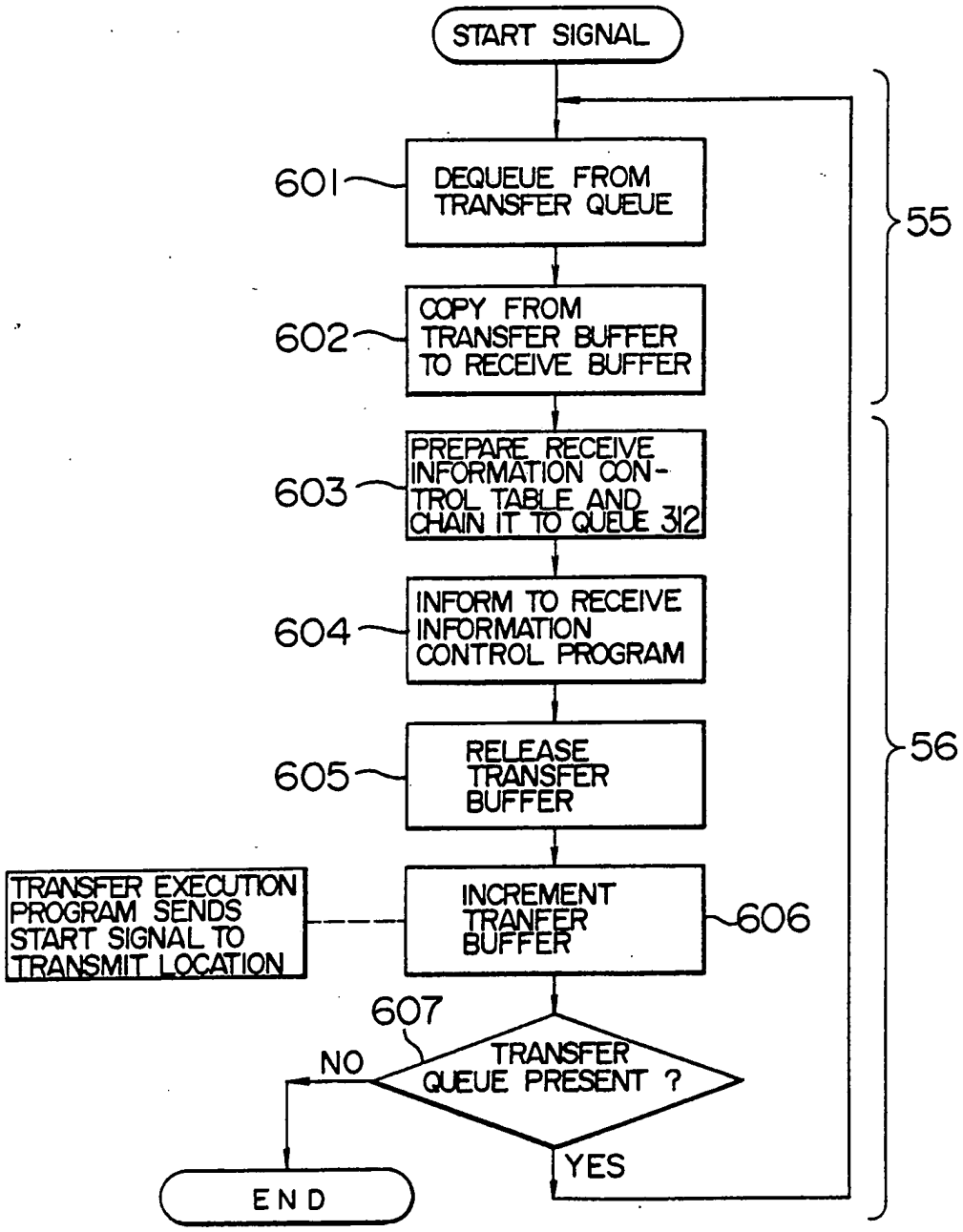

START
101
DEQUEUE FROM TRANSFER QUEUE
102
RECEIVE BUFFER IN RECEIVE SPACE SECURED ?
NO
YES
108
STOP TRANSMISSION
109
UPDATE TRANSFER QUEUE POINTER
55
103
DECREMENT AVAILABLE RECEIVE BUFFERS
104
TRANSFER BUFFER IN COMMON AREA SECURED ?
NG
OK
110
INCREMENT AVAILABLE RECEIVE BUFFER
105
DECREMENT 410
106
COPY INFORMATION INTO TRANSFER BUFFER
56
107
ENQUEUE INTO COMMON AREA TRANSFER QUEUE
112
TRANSFER EXECUTION PROGRAM SENDS START SIGNAL TO RECEIVE LOCATION
113
TRANSFER QUEUE PRESENT IN USER AREA ?
NO
YES
111
STOP TRANSFER
END

FIG. 6


START SIGNAL
601
DEQUEUE FROM TRANSFER QUEUE
602
COPY FROM TRANSFER BUFFER TO RECEIVE BUFFER
55
603
PREPARE RECEIVE INFORMATION CONTROL TABLE AND CHAIN IT TO QUEUE 312
604
INFORM TO RECEIVE INFORMATION CONTROL PROGRAM
605
RELEASE TRANSFER BUFFER
56
TRANSFER EXECUTION PROGRAM SENDS START SIGNAL TO TRANSMIT LOCATION
INCREMENT TRANFER BUFFER
606
607
TRANSFER QUEUE PRESENT ?
NO
YES
END